

teach each and every element of the claim. MPEP Section 2131. Without admitting that Maki is prior art and reserving the right to establish that Maki is not prior art, Applicants respectfully submit that Maki does not disclose or teach all of the elements of the claimed invention.

As amended, claim 1 recites:

**“a computer configured to determine a position and shape of an object of interest from video images and to characterize activity of said object of interest based on analysis of changes in said position and said shape over time.”**

As described in greater detail in the application from page 16, line 14 through page 19, line 20, embodiments of the invention of claim 1 characterize activities of an object, for example a biological mouse, based on changes in the object, for example movement or stillness over time. Examples of such characterization are provided at page 22, lines 3-14, including characterizations such as eating and sleeping.

As amended, claim 16 requires:

**“classifying said foreground object in said plurality of video images” and  
“characterizing said activity of said foreground object based on comparison of said classifications to activity of a standard object.”**

At page 22, lines 3-8, of the application, a description is provided of an embodiment of claim 16 for classifying object changes. At page 18, lines 9-12, a description is provided of a computer configured “to automatically monitor a video image to identify, track and classify the actions (or state) of the object and its movements (or stillness) over time within a sequence of images.” Further, at page 23, line 1, through page 24, line 18, of the application, an embodiment of claim 16 characterizing activity of an object based on comparison to a standard object is shown.

Maki shows no such computer configured to “characterize activity of said object of interest based on analysis of changes in said position and shape over time” of claim 1, nor does it show a method of “characterizing said activity of said foreground object based on comparison to activity of a standard object” of claim 16. Furthermore, Maki does not show “classifying said foreground object” as in claim 16. Since these limitations are not shown, disclosed or taught by Maki, Claims 1 and 16 are patently distinguishable from Maki, under MPEP Section 706.02(b).

The Office Action states Maki discloses “a system, comprising a computer configured to ... characterize activity of said object of interest based on analysis of changes in said position and shape over time”, essentially quoting Claim 1 and citing to column 15, lines 49-57 of Maki. Applicants respectfully submit that no such configuration to “characterize activity of said object of interest” appears in Maki.

Since Maki does not teach or suggest all of the limitations of claims 1 and 16, Applicants respectfully request withdrawal of the §102(e) rejection of claims 1 and 16. Since claims 2-5 and 10-15 are dependent on claim 1, and claims 17-24, 26-29 and 31-33 are dependent on claim 16, they are allowable over Maki for at least the same reasons.

The second half of the Office Action states rejections of claims 6-9, 25, 30 and 34-42 under 35 U.S.C. §103(a) based on Maki, Crabtree and Smith. Applicants respectfully disagree with the Examiner. No suggestion or motivation to combine Maki and Crabtree, or Maki, Crabtree and Smith is provided in the Office Action, as required by MPEP §706.02(j)

and §2143. Such suggestion and motivation is particularly necessary as Maki, Crabtree and Smith are directed to different and distinct problems with different solutions.

Specifically, Maki is directed to problems in creating three-dimensional (3-D) models of objects and to enabling 3-D sensuous pointing. Maki is thus directed to a system and method "used for three-dimensional CAD (computer-aided design) for aiding in designing industrial parts and so on, the creation of images using three-dimensional CG (computer graphics), or HI (human interface) using portraits, and mobile robots, and suitable for aiding in forming the 3D model of objects." (column 1). Crabtree is directed to problems involving tracking the basic movement of objects, such as people, through a scene – it produces data describing the path of objects through a scene. Smith is directed to problems of human facial image processing, and primarily to the generation of a "substitute face" for videoconferencing and other facial image applications.

In the Office Action, the Examiner has proposed that Maki may be modified in view of Crabtree by utilizing "the standard deviation value for the region cluster density." The Examiner concludes that it would have been obvious to one of ordinary skill to modify Maki by incorporating such a standard deviation value, and thus claims 6-9, 25 and 30 are rejected under 35 U.S.C. §103(a) as unpatentable.

An examination of Maki and Crabtree reveals that the Examiner's proposed combination, even if proper under §103 – and applicants do not concede that it is – does not result in a disclosure that teaches or suggests each of the limitations of the rejected claims, either expressly or impliedly, as is required to sustain a rejection under §103. See

MPEP 706.02(j). The Applicants respectfully note that the above remarks relating to the inapplicability of Maki to claim 1 are equally applicable here for claims 6-9, and the above remarks relating to the inapplicability of Maki to claim 16 are equally applicable for claims 25 and 30. Specifically, Maki does not show or suggest "a computer configured ... to characterize activity of said object of interest" from claim 1, and neither does Crabtree. Neither Maki nor Crabtree show or suggest "classifying said foreground object in said plurality of video images" or "characterizing said activity of said foreground object based on comparison of said classifications to activity of a standard object" from claim 16. Crabtree may show tracking an object's path and position over time, but it does not teach or suggest the limitations of claims 1 and 16. As each of the dependent claims also contain limitations similar to those discussed above with respect to the independent claims, a reference's failure to disclose the independent claims limitations cannot be overcome by citing to the further limitations of the dependent claim. While we do not acquiesce to the Examiner's reasons for rejecting the dependent claims, we believe that the response to the independent claims sufficiently addresses the cited basis for rejection.

Since Maki as modified by Crabtree does not teach or disclose all of the limitations of claims 1 and 16, or rejected claims 6-9, 25 and 30 depending therefrom, and further since no motivation is provided for modifying Maki in view of Crabtree as proposed by the Examiner (see MPEP 706.02(j)), Applicants respectfully request that the §103 rejection of claims 6-9, 25 and 30 over Maki and Crabtree be withdrawn. Since claims 6-9 are dependent on claim 1, and claims 25 and 30 are dependent on claim 16, they are also

allowable over Maki for at least the same reasons that claims 1 and 16 should be allowed as described above.

Further, in response to the rejections of individual dependent claims in paragraph 4 of the Office Action, Applicants respectfully submit that the limitations of claim 5 and 6 are not taught or suggested by Maki. The Office Action cites to Maki column 25, lines 45-52, but therein Maki only describes a "feature point" extraction process, not the background subtraction algorithm of claim 6 in which "a standard deviation map of the set of video images is created", "a bounding box where a variation is greater than a predetermined threshold is removed from said set of video images", and "the set of images less said bounding boxes is averaged to produce a background image." A "feature point" in Maki is a group of pixels on an image object – such as a mole on an image of a human face – that is larger than a threshold (column 9, lines 7-10).

Similarly, regarding the Office Action's suggestion that the addition of Crabtree to Maki would teach or suggest the limitations of claim 6, Applicants respectfully submit that Maki and Crabtree do not teach or suggest those limitations. The cited portion of Crabtree (column 17, 61-64) discusses the use of "standard deviation values for the region cluster density (the number of pixels in a region cluster/area in the oriented bounding box)." It does not teach or suggest the invention of claim 6 in which "a standard deviation map of the set of video images is created", "a bounding box where a variation greater than a predetermined threshold is removed from the said set of video images", and "the set of images less said bounding boxes is averaged to produce a background image."

Finally, the Office Action cites to Maki in rejecting claims 7 - 9. Applicants respectfully submit that the cited portions of Maki (column 25, lines 1-11, and column 27, lines 20-31), and in fact the whole of Maki as described above, do not include various features listed on page 5 of the Office Action, such as: "an object shape and location change classifier for classifying the activity of said object", a "segregation module", a "behavior identification module", or a "standard object behavior storage module", of claims 7-9.

The Examiner has further proposed that Maki may be modified in view of Crabtree and Smith by incorporating a "Hidden Markov Model" from Smith. The Examiner concludes that it would have been obvious to one of ordinary skill to modify Maki and Crabtree by incorporating such a Hidden Markov Model, and thus independent claims 36 and 39 are rejected under 35 U.S.C. §103(a) as unpatentable.

An examination of Maki, Crabtree and Smith reveals that the Examiner's proposed combination, even if proper under §103 – and applicants do not concede that it is – does not result in a disclosure that teaches or suggests each of the limitations of the rejected claims, either expressly or impliedly, as is required to sustain a rejection under §103. See MPEP 706.02(j). The Applicants respectfully note that the above remarks relating to the inapplicability of Maki to independent claim 16 are equally applicable here in relation to dependent claims 34-35. Again, Maki does not show or suggest "classifying said foreground object in said plurality of video images" and "characterizing said activity of said

foreground object based on comparison of said classifications to activity of a standard object" from claim 16.

As amended, claim 36 requires:

**"removing a bounding box area of said image where variation is above a predetermined threshold to create a partial image" and "combining said partial image with an existing set of partial images by averaging the set of images to generate a complete background image depleted of a desired foreground object."**

Maki, Crabtree and Smith do not teach or suggest "removing a bounding box area of said image where variation is above a predetermined threshold to create a partial image", nor do they teach or suggest "combining said partial image with an existing set of partial images by averaging the set of images to generate a complete background image depleted of a desired foreground image." Specifically, Column 17, lines 41-43, of Smith refers only to a device implementing a Hidden Markov Model, without any reference to bounding box variation thresholds or averaging a set of images to generate a background image. Further, as described above, Maki and Crabtree do not teach such a method.

Claim 39 requires:

**"a computer configured to detect and characterize at least a single behavior of an object of interest based on movement of said object, using video image analysis."**

Maki does not disclose or suggest such a computer configured to "characterize at least a single behavior of an object of interest based on movement of said object, using video image analysis." Further, Crabtree and Smith do not add such elements to Maki. No

motivation or suggestion is offered by the Examiner, nor are such found in Maki, Crabtree or Smith, to modify Maki in view of Crabtree and Smith in the manner proposed by the Examiner, as is required to sustain a rejection under §103. See MPEP 706.02(j).

Since Maki as modified by Crabtree and Smith does not teach all of the limitations of claims 36 and 39, and further since no motivation is provided for modifying Maki in view of Crabtree and Smith as proposed by the Examiner, Applicants respectfully request that the §103 rejection of claims 34-42 over Maki, Crabtree and Smith be withdrawn. Since claims 34-35 are dependent on claim 16, they are also allowable over Maki for at least the same reasons that claim 16 should be allowed as described above. Similarly, since claims 37-38 are dependent on Claim 36, and claims 40-42 are dependent on claim 39, they are also allowable over Maki, Crabtree and Smith for at least the same reasons that claims 36 and 39 should be allowed as described above



In view of the above remarks, Applicants believe that reconsideration and allowance of the application is warranted. If the Examiner has any questions, he is invited to call the undersigned at the number listed below.

Respectfully submitted,

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